

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17
- 18
- 19
- 20
- 21
- 22

1 In the June 5, 2002, Office Action, the Examiner rejected the pending claims under 35
2 U.S.C. §103 (a), as being unpatentable over (i) Karger et al. U.S. Patent No. 6,175,112
3 (“Karger”) in view of Ikebe Japanese Patent No. 352066488 (“Ikebe”), (ii) Bertsch et al. U.S.
4 Patent No. 6,359,275 (“Bertsch”) in view of Ikebe, (iii) Bertsch in view of Ikebe and Karger, and
5 (iv) Bertsch in view of Ikebe and Mordehai et al. U.S. Patent No. 5,352,892 (“Mordehai”). In the
6 ensuing sections of this response, applicant will respond to those rejections and highlight the
7 differences between the amended claims and the cited references such that the Examiner’s
8 rejections should be reconsidered and withdrawn. In particular, applicant would like to direct the
9 Examiner’s attention to applicant’s novel device for transporting ions from a first pressure region
10 to a second pressure region within a mass spectrometer utilizing first and second capillary
11 sections removably coupled by a union. Applicant is unaware of anything like this in the prior
12 art, and even the references relied on by the Examiner do not suggest the applicant’s novel
13 invention. In short, applicant respectfully submits that the Examiner’s reliance on Karger, Ikebe,
14 Bertsch, and Mordehai is misplaced – as applicant’s invention is very different from what is
15 disclosed therein.
16

1 **I. THE INVENTION**

2 The present invention relates generally to mass spectrometers, and more specifically,
3 comprises a multiple part capillary device for use in a mass spectrometer. Disclosed and claimed
4 is a multiple part capillary comprising at least two capillary sections removably joined with an
5 airtight seal by a union for use in mass spectrometry (particularly with ionization sources) to
6 transport ions between pressure regions of a mass spectrometer for analysis. In particular, the
7 multiple part capillary transports ions from an elevated pressure ionization source to a first
8 vacuum region of a mass analysis system such that, for example, the source may be opened for
9 cleaning, repair, replacement of parts (including a first section of the capillary of the invention),
10 etc. without need for breaking the vacuum seal in the mass spectrometer and shutting down the
11 vacuum pump -- a significant savings of both time and money regarding performing mass
12 analysis.

13
14 **II. THE EXAMINER'S REJECTIONS**

15 In the June 5, 2002, Office Action, the Examiner rejected claims 1-4, and 15 under 35
16 U.S.C. §103 (a), as being unpatentable over Karger in view of Ikebe. In the opinion of the
17 Examiner, Karger discloses:

18 “an apparatus for transporting ions from a first pressure region to a second pressure
19 region within a mass spectrometer, wherein the apparatus comprises; first and second
20 capillary sections (24, 32), each having an inlet and an outlet end; and a union (34)
21 wherein the outlet end of the first capillary section is positioned within said first
22 opening of the union, and wherein the inlet section of the second capillary section is
23 positioned within the second opening of the union. However, Karger does not
24 specifically state that the first and second capillary sections are removably positioned
25 in the union. Ikebe does teach first and second capillary sections being removably
26 positioned in a union... Therefore, it would have been obvious to a person of ordinary

1 skill in the art at the time the invention was made to have the first and second
2 sections of a capillary removably positioned within a union in order to allow one to
3 replace dirty capillaries without lowering the vacuum of the entire mass spectrometer
4 as taught in Ikebe.”

5
6 In addition, the Examiner rejected claims 1, 5-6, and 8 under 35 U.S.C. §103 (a), as being
7 unpatentable over Bertsch in view of Ikebe. In the opinion of the Examiner, Bertsch teaches:

8 “an apparatus for transporting ions from a first pressure region to a second pressure
9 region within a mass spectrometer, wherein the apparatus comprises first and second
10 capillary sections (55, 59) each having an inlet end and an outlet end and a union (60)
11 having first and second openings wherein the outlet end of the first capillary section
12 is positioned within the first opening of the union (60) and the [sic] wherein the inlet
13 of the second capillary section is positioned within the second opening of the union
14 (60). However Bertsch (275) does not specifically state that the capillary sections are
15 removably positioned with the union. See Bertsch (275) abstract, figs. 2,5, col. 1 lines
16 10-21, col. 4 lines 4-22 and col. 5 lines 30-67. Ikebe (JP 488) does teach the capillary
17 sections being removably positioned with the union. See Ikebe (JP 488) abstract and
18 figs. 1-5. Therefore, it would have been obvious to a person of ordinary skill in the
19 art at the time the invention was made to have the first and second sections of a
20 capillary removably positioned within a union in order to allow one to replace dirty
21 capillaries without lowering the vacuum of the entire mass spectrometer as taught in
22 Ikebe (JP 488).”

23
24 Next, claim 12 was rejected under 35 U.S.C. §103 (a), as being unpatentable over Bertsch
25 in view of Ikebe and further in view of Karger. In the opinion of the Examiner, Bertsch teaches
26 that:

27 “the capillaries may be used as an interface between other ions sources. See Bertsch
28 (275) col. 4 lines 5-20. However, Bertsch (275) does not specifically state that ion
29 source be a matrix assisted laser desorption ionization source. Karger (112) does
30 teach using capillaries with a matrix-assisted laser desorption ionization source.”

31
32 Finally, claims 7, and 9-11, 13-14 were rejected under 35 U.S.C. §103 (a), as being
33 unpatentable over Bertsch in view of Ikebe and further in view of Mordehai. In the opinion of
34 the Examiner, Bertsch discloses:

35 “that the capillaries may be used as an interface between other ion sources. See

1 Bertsch (275) col. 4 lines 5-20. However, Bertsch (275) does not specifically state
2 that ion source be an API source. Mordehai (892) does teach and API source using
3 capillaries. See Mordehai (892) figs. 1, 11 and abstract. Therefore, it would have
4 been obvious to a person of ordinary skill in the art at the time the invention was made
5 to use an API source with the capillary interface in Bertsch (275) since it was known
6 to use API sources with capillaries to transport ions into a mass spectrometer.”

7
8 **III. THE EXAMINER’S REJECTIONS**
9 **SHOULD BE RECONSIDERED**
10

11 Applicant respectfully submits that claims 1-15 are neither taught nor rendered obvious
12 by the cited references. We are confident that the Examiner will recognize that the rejections of
13 claims 1-15 under 35 U.S.C. §103(a) based on Karger in view of Ikebe, Bertsch and/or Mordehai
14 were made with the benefit of the teaching’s of applicant’s specification, and could only be the
15 result of hindsight reconstruction of the applicant’s invention.

16 Initially, the applicant disagrees with the Examiner’s opinion that Karger teaches an
17 “apparatus for transporting ions.” Rather, Karger teaches a “continuous on-line liquid sample
18 introduction.” Specifically, the device of Karger transports “a solution of sample containing,
19 e.g., peptide and matrix” which is “infused directly into the source chamber of a mass
20 spectrometer.” Nowhere does Karger teach a device for the transport of ions from an ionization
21 source region to a first pressure region within a mass spectrometer.

22 In addition, the Examiner states that Karger teaches a “union (34) wherein the outlet end
23 of the first capillary section is positioned within said first opening of the union, and wherein the
24 inlet section of the second capillary section is positioned within the second opening of the
25 union.” Applicant disagrees. Rather, the liquid junction (34) of Karger merely functions to

1 provide a matrix solution for use in Matrix-Assisted Laser Desorption Ionization (MALDI). It
2 does not secure the capillaries in position nor render them removable like the claimed invention.
3 In contradistinction, the union according to the present invention provides an airtight junction
4 between the capillary sections, while at the same time allowing the capillary sections to be
5 securely and removably positioned within the union. Karger does not teach such a device.

6 The Examiner next argues that Ikebe teaches "first and second capillary sections being
7 removably positioned in a union." Again, applicant respectfully disagrees. Rather, Ikebe merely
8 teaches two separate capillaries that serve to connect a gas chromatograph to a mass spectrometer
9 for the transport of a liquid sample into the mass spectrometer's ionization source -- not the
10 transport of ions. In contrast, the claimed multiple part capillary of the present invention is
11 designed to transport ions from an ionization source region into a vacuum region of a mass
12 spectrometer without the need for shutting down the vacuum system. Also, in contrast to the
13 Examiner's argument, the capillary tubes of Ikebe are connected (outside any vacuum region)
14 with a "shrink tube" surrounding the ends of the capillaries -- no suggestion is made that such
15 connection is removable like the present claimed invention.

16 Turning next to the Examiner's rejection of claims 1, 5-6 and 8, in the opinion of the
17 Examiner, Bertsch teaches an apparatus comprising, *inter alia*, "first and second capillary
18 sections (55, 59)" and "a union (60)" as claimed in the subject application. Applicant disagrees.
19 Rather, Bertsch discloses a single capillary 52 and two "end cap" electrodes 56 secured to the
20 ends of the capillary by an electrically conductive sleeve. Nothing in Bertsch suggests separate
21 capillary sections for transporting ions from a first pressure region to a second pressure region
22 within a mass spectrometer like the claimed invention, i.e., such that the separate capillary

1 sections may be removed, cleaned or replaced while maintaining the conditions (i.e., vacuum,
2 etc.) at the opening in the second capillary section which leads to the mass spectrometer. That is,
3 a user need not disrupt the operation of the mass spectrometer.

4 Moreover, Bertsch teaches away from the claimed invention where it is stated that the
5 endpieces are attached to the capillary tube through "application of an adhesive such as an epoxy
6 at the juncture between the endpiece and the capillary." This is not removable. In contrast, the
7 present invention discloses the use of a union that allows the separate capillary sections to be
8 removable.

9 Furthermore, the applicant respectfully points out that, standing on their own, these
10 references provide no justification for the combination asserted by the Examiner.

11 "Obviousness cannot be established by combining the teachings of the prior art to
12 produce the claimed invention, absent some teaching or suggestion supporting the
13 combination. Under section 103, teachings of references can be combined only if
14 there is some suggestion or incentive to do so." *ACS Hospital Systems Inc. v.*
15 *Montefiore Hospital*, 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984)
16 (emphasis in original).

17
18 The cited reference provides no such suggestion or incentive for the combination suggested by
19 the Examiner. Therefore, the obviousness rejection could only be the result of a hindsight view
20 with the benefit of the applicant's own specification. However,

21 "To draw on hindsight knowledge of the patented invention, when the prior art
22 does not contain or suggest that knowledge, is to use the invention as a template
23 for its own reconstruction -- an illogical and inappropriate process by which to
24 determine patentability. The invention must be viewed not after the blueprint has
25 been drawn by the inventor, but as it would have been perceived in the state of
26 the art that existed at the time the invention was made." (citations omitted)
27 *Sesonic v. Aerosonic Corp.*, 38 U.S.P.Q. 2d. 1551, 1554 (1996).

28
29 In addition, the combination advanced by the Examiner is not legally proper -- on

1 reconsideration the Examiner will undoubtedly recognize that such a position is merely an
2 "obvious to try" argument. The disclosures of Karger, Ikebe, Bertsch and Mordehai do not
3 reveal any functional or design choices that could possibly include that of the applicant's
4 invention. Neither Karger nor Bertsch teach the use of removable capillary sections for
5 transporting ions within a mass spectrometer. Despite the Examiner's suggestion, Ikebe does
6 not teach use of removable capillary sections like the claimed invention. However, even if
7 Ikebe taught such a device, it would not have been obvious to one of skill in the art to combine
8 the teachings of Ikebe with the teachings of either Karger or Bertsch. In fact, both Karger and
9 Bertsch teach away from such a combination. First, Karger teaches use of a liquid junction
10 between capillary sections outside the source region to provide the matrix solution to a sample
11 for performing matrix-assisted laser desorption ionization (MALDI) mass spectrometry analysis.
12 Such a junction simply could not be made removable through a mere combination with a non-
13 liquid junction such as Ikebe. Second, Bertsch teaches use of an adhesive to secure the
14 conductive sleeve 60 onto both the capillary 52 and end cap electrode 56 -- with no suggestion
15 anywhere that the sleeve connect the capillary and end piece in a non-affixed manner. Thus, it
16 would not have been obvious to make this removable.

17 Accordingly, it was not obvious to combine the cited references to arrive at the present
18 invention. At best it might have been obvious to try such a combination. Of course, "obvious
19 to try" is not the standard for obviousness under 35 U.S.C. §103. *Hybritech, Inc. v. Monoclonal*
20 *Antibodies, Inc.*, 231 USPQ 81, 91 (Fed. Cir. 1986).

21 Under the circumstances, it is respectfully submitted that the Examiner has succumbed
22 to the "strong temptation to rely on hindsight." *Orthopedic Equipment Co. v. United States*, 702

1 F.2d 1005, 1012, 217 USPQ 193, 199 (Fed. Cir. 1983):

2 "It is wrong to use the patent in suit as a guide through the maze of prior art
3 references, combining the right references in the right way so as to achieve the
4 result of the claim in suit. Monday morning quarter backing is quite improper
5 when resolving the question of non-obviousness in a court of law." *Id.*

6 Applicant submits that the only "motivation" for the Examiner's combination of the
7 references is provided by the teachings of applicant's own disclosure. No such motivation is
8 provided by the references themselves.

9 Therefore, as is evidenced by the above amendments and remarks, the present invention,
10 for the first time, discloses a multiple part capillary device for use in a mass spectrometer for the
11 delivery of ions from a source region to a first pressure region of a mass spectrometer
12 configured to removably interface to and maintain the vacuum condition of the mass
13 spectrometer. A device such as this is neither taught nor suggested anywhere in the prior art,
14 including Karger, Ikebe, Bertsch and Mordehai.

1

2

CONCLUSION

3

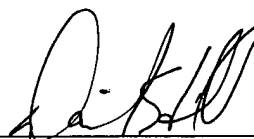
In view of the foregoing, applicant respectfully submits that the present invention
represents a patentable contribution to the art and the application is in condition for allowance.

4

5

Early and favorable action is accordingly solicited.

Respectfully submitted,



Dated: November 5, 2002

David M. Hill
Reg. No. 46,170
WARD & OLIVO
708 Third Avenue
New York, New York 10017
(212) 697-6262